

Quabbin Reservation White-Tailed Deer Impact Management Program: RESULTS FROM 2012



dc
Massachusetts



**Department of Conservation and
Recreation**

Division of Water Supply Protection
Natural Resources Section

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COMMONWEALTH OF MASSACHUSETTS · EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS

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2012 Quabbin Deer Hunt Executive Summary

2012 Quabbin Deer Hunt					
	Nov 29 & 30 HARDWICK	Nov 29 & 30 PELHAM	Dec. 6 & 7 NEW SALEM	Dec. 6 & 7 PRESCOTT	TOTALS
Hunters Selected	197	292	245	415	1,149
Eligible Hunters (Returning or Attended Orientation)	186	273	232	402	1,093
Scouting - % participating Day 1, % participating Day 2, (Total %)	19%, 27% (43%)	28%, 26% (49%)	19%, 30% (44%)	26%, 37% (54%)	24%, 31% (49%)
Attendance @ Hunt - Day 1/ Hunters Eligible to Hunt	156 (84%)	226 (83%)	196 (84%)	336 (84%)	914 (84%)
Attendance @ Hunt - Day 2/ Hunters Eligible to Hunt	113 (61%)	163 (60%)	143 (62%)	236 (59%)	655 (61%)
Attendance Day 1 and/or Day 2 (Participation Rate)	157 (84%)	231 (85%)	199 (86%)	344 (86%)	931 (85%)
Deer Taken - Day 1 (# Females, # Males)	20 (13, 7)	13 (6, 7)	11 (3, 8)	18 (8, 10)	62 (30, 32)
Deer Taken - Day 2 (# Females, # Males)	3 (1, 2)	5 (3, 2)	6 (1, 5)	8 (3, 5)	22 (8, 14)
Total -both days (# Females, # Males)	23 (14, 9)	18 (9, 9)	17 (4, 13)	26 (11, 15)	84 (38, 46)
Success Rate	14.6%	7.8%	8.5%	7.6%	9.0%
Size of Hunt Area (Mile ²)	5636.7 acres (8.8)	8,487.2 acres (13.3)	6871.4 acres (10.7)	12,019.9 acres (18.8)	33,015.2 acres (51.6)
Deer Harvest/Square Mile	1.58	1.00	1.20	1.66	1.36
Largest Deer Taken	M – 162 lbs, 3.5 yrs, 9 pt	M – 211 lbs, 3.5 yrs, 9 pt	M – 198.5 lbs, 3.5 yrs, 8 pt	M – 190 lbs, 3.5 yrs, 11 pt	M – 198 lbs, 3.5 yrs, 6 pt (PEL)
	F – 134 lbs, 3.5 yrs	F – 139.5 lbs, 3.5 yrs	F – 137 lbs, 3.5 yrs	F – 132 lbs, 3.5 yrs	F – 137 lbs, 3.5 yrs (PET)

2012 Weather Notes:

During the first week of shotgun season, Pelham and Hardwick (Nov 29th and 30th) saw a morning dusting of snow with temperatures starting below or at freezing with a mean temperature of 36 (Low: 24°; Hi: 48°). The second week's hunt in New Salem and Prescott (Dec 7th and 8th) saw light rain on the first morning and mostly overcast skies and temperatures starting below freezing with a slightly warmer mean temperature of 38 (Low: 29°; Hi: 45°).

I. BACKGROUND

Sustainable forest management and water quality are closely linked. Through the stabilization of soil, forests minimize erosion, reduce sedimentation and improve water quality. Woodlands protect water bodies and watercourses by trapping sediments and pollutants from other up-slope land uses and activities. Forest managers have long been concerned about the impacts of deer browsing on forest regeneration. In 1989, a regeneration study at Quabbin Reservoir, MA found that there was not adequate regeneration to maintain a healthy, resilient, diversified forest cover due to sustained high deer densities and herbivory. For the Massachusetts Department of Conservation and Recreation- Division of Water Supply Protection, the growing concern for potential long-term consequences of those impacts on water quality needed to be addressed. In 1991, Quabbin Reservation was opened to limited, controlled public deer hunting after 50 years without hunting. The program's goal was to reduce the impacts of deer browsing to a level that allowed and promoted the development of a healthy, resilient, diverse forest that could adequately and continuously protect water quality. Hunting has been conducted on the reservation each year since.

The controlled hunts constituted only one component of a comprehensive 1991 White-tailed Deer Impact Management Plan for the reservation. Six years of controlled hunting was to be followed by a major review and re-evaluation of the program. That review was conducted in the spring of 1997 when two reports (*Quabbin Regeneration: Summary Report 1988-97* and *Quabbin Reservation White-tailed Deer Impact Management Program: Results and Evaluation 1991-1996*) were issued by the Division. Also at that time, recommendations for the next phase of the program were issued in the document *Quabbin Reservation White-tailed Deer Impact Management Program: Summary Report and Proposal 1997*. Those recommendations called for a continuation of the controlled hunting program with several changes proposed to make the program more efficient.

Major components of the deer population reduction program were to:

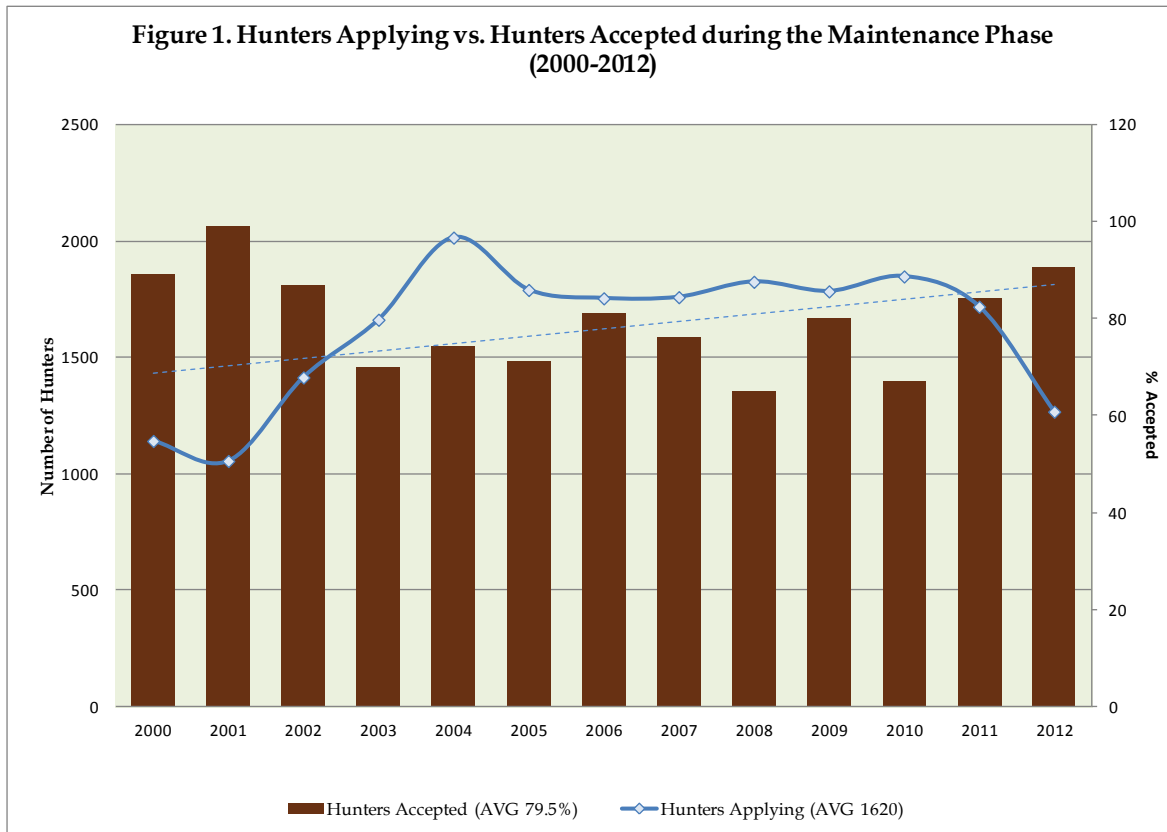
- 1.) Reduce population densities
- 2.) Maintain those densities at a level that allows for the continued growth and regeneration of forest tree species.

After several years of controlled hunts, substantial reductions in deer population densities were achieved in all hunt areas, and the Division moved into its *Maintenance Phase* of the program in 2000. The Maintenance Phase was essential for maintaining relatively stable deer population levels and eliminating potentially large fluctuations in deer densities that could occur if hunting were stopped for an extended period of time. In the absence of hunting mortality, deer populations at lower densities with little natural mortality and an increasing food supply would expand and could jeopardize the forest regeneration progress made to date. As part of the Maintenance Phase, the program is reviewed every 5 years. In 2009, the program was reviewed and re-evaluated. It resulted in a new plan that outlined proposed activities for the next five years (*Quabbin Reservation White-Tailed Deer Impact Management Program: Program Review 2004-2009 and Recommended Actions for 2010-2014*). The following report summarizes results from 2012 and outlines the program's goals and plans for 2013.

II. 2012 PROGRAM RESULTS

A. HUNTER INTEREST

Participants in the hunt were chosen in a random lottery from a pool of licensed hunters submitting the required application form and fee. The number of hunters applying for the hunt varied from approximately 1,050 in 2001 to over 9,500 in 1992. The number of hunters chosen in any one year has varied, depending on the number of areas being hunted and the number of hunting segments per area (Figure 1).



The number of hunters applying to the Quabbin hunts has dropped sharply since 1992. The hunt has changed significantly, and the deer density is now similar to what is outside of the Quabbin gates in Wildlife Management Zone 6. While some of the novelty of hunting Quabbin has worn, interest still remains high. Further, since 2000 only 4 of the 5 blocks were hunted annually, and fewer hunters were needed to maintain the same hunter densities. The number of applications received in 2012 (1,269) was lower than the average from the last 11 years (1,620). It is impossible to predict future trends in hunter interest, although statewide and regional trends would indicate that the hunter base and hunter recruitment has continued to diminish. Fortunately, the number of hunters being participating has allowed DCR to achieve its goals in forest regeneration. In 2012, the number of hunters was reduced to achieve 1 hunter /35 acre hunter density in all zones.

In 2012, DCR extended the orientation requirement for hunters from every 6-years to every 7-years. Therefore, hunters who had attended at least one orientation session in the past 7 years were exempt from attending a session in 2012. At the orientation, a video featuring Division Rangers presented the reasons for the hunt, safety considerations, rules and regulations, sanitary concerns, procedures and related topics. Each hunter was given the option to purchase an antlerless permit from MassWildlife and assigned a specific hunt area and hunting segment. All hunters were assigned to specific access gates and required to check in and out each day, thereby effecting greater control over hunter distribution.

Following the new 5-year hunting plan described in the 2009 report (see **Quabbin Reservation White-Tailed Deer Impact Management Program: Program Review 2005-2009 and Recommended Actions for 2010-2014**), Petersham was excluded from the hunt in 2012. The other four blocks were hunted for two consecutive days each.

Bonus Antlerless Permits

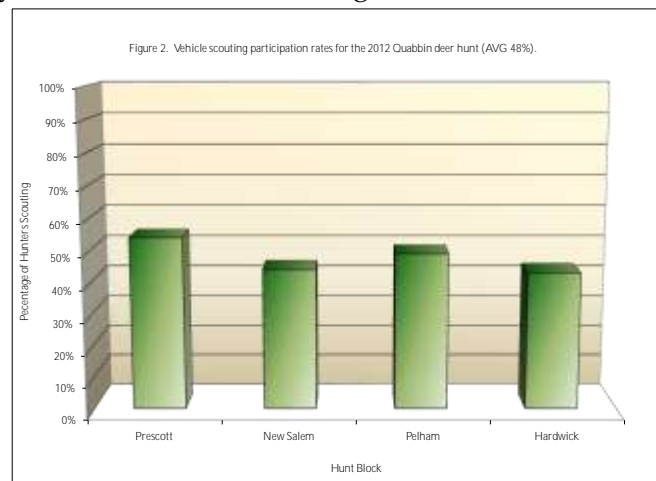
As discussed in the 2001 report, **Quabbin Reservation 5-year (2000-2004) White-Tailed Deer Impact Management Program: Program Status and Results from 2001**, the Division successfully lobbied MassWildlife to exempt antlerless deer killed at Quabbin from the statewide bag limit. All Quabbin hunters were given the option to purchase one antlerless deer permit (ADP) prior to hunting. This is different from previous years when hunters were required to purchase an antlerless permit.

Scouting

The Division has always allowed eligible hunters to access the hunt areas by foot (except Prescott), and in some areas by bicycle, for scouting prior to the hunt. However, efficient and thorough scouting was difficult because many of the hunt areas were large or restricted (Prescott). The Division modified the hunt

program and allowed vehicle access for scouting hunters in 1999. That year, the Division allowed 1 day of car scouting for Prescott hunters only. In 2000, the program was expanded to allow 1 day vehicle scouting for all the hunted blocks. Since 2001, the program has allowed 2 consecutive days of vehicle scouting for all hunting blocks. In 2003, scouting times were shortened by a few hours in order to conserve resources. In addition, data from

previous years of scouting indicated that most hunters who scouted were only in the field for a maximum of 3 hours. Reducing the scouting hours did not appear to affect the level of participation. The participation rate for scouting prior to the 2012 hunt ranged from 54 percent in the Prescott block to 43 percent in Hardwick (Fig. 2). The verbal feedback from hunters about scouting remains positive. In 2012, at the request of the hunters, DCR pushed the scouting



dates back a week to the weekend before Thanksgiving and extended it by 2 hours each day (8 am- 3 pm) . Hunters are able to efficiently scout larger areas and cover more territory. Further, car scouting allows Prescott hunters the only opportunity to visit the hunt area prior to the hunt. Car scouting will be allowed prior to the 2013 hunt in all hunting blocks being hunted.

B. HARVEST RESULTS

In 2012, 84 deer were harvested (Table 1). The number of deer harvested was 1.6 per mi² in 2012. Since 2000, the number of deer harvested per mi² has fluctuated significantly between 1.4 and 6.8.

Table 1. Results of controlled deer hunt on Quabbin Reservation, by year, 2000-2012.

Year	Total Deer	% Female	% Male	% A/L ¹	DEER/Mi ² (harvest)	# HUNTERS	HUNTER SUCCESS ²	Mi ² HUNTED
2000	106	47.2	52.8	55.7	2.2	818	13.0%	49.2
2001	101	51.5	48.5	58.4	2.0	855	11.8%	51.6
2002	153	48.4	51.6	64.1	3.1	967	15.8%	49.3
2003	306	69	31	83.7	6.8	938	32.6%	45.0
2004	167	47.9	52.1	58.7	2.9	1259	13.3%	56.7
2005	117	53	47	65	2.4	1071	10.9%	49.2
2006	117	38.5	61.5	42.7	2.1	1165	10.0%	55.0
2007	149	44.9	55.1	56.5	3.0	1086	13.7%	49.3
2008	80	43.8	56.2	55.0	1.8	1103	7.3%	43.7
2009	200	57.5	42.5	67	3.6	1225	16.3%	55.4
2010	116	41.4	58.6	61.2	2.4	1043	11.1%	49.2
2011	73	37.0	63.0	49.3	1.4	1186	6.2%	53.7
2012	84	45.2	54.8	59.5	1.6	931	9.0%	51.6
Overall/ Avg	1,769	48.1	51.9	59.8	2.7	13,647	13.2%	50.7

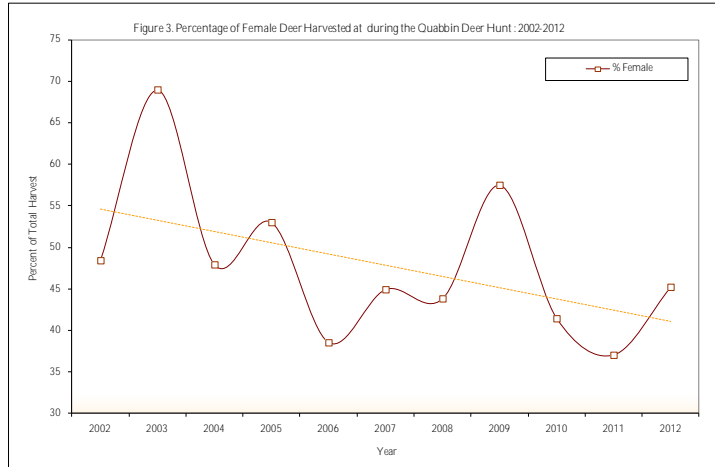
¹ A/L: antlerless; females and young males with antlers less than 3 inches long.

² Hunter Success is the number of deer taken per 100 hunters. Some hunters may have taken more than one deer, so these figures slightly overestimate the proportion of successful hunters.

Female and Antlerless Harvest

An initially critical component to the Quabbin hunting program was to facilitate a substantial reduction in the deer herd in all management blocks. The most effective way to achieve this goal was to reduce the number of female deer in each area, since the number of adult female deer in an area will determine population characteristics. In addition, evidence suggests that female yearlings (1 yr old) may also breed in Massachusetts. Guaranteed antlerless permits, effective communication, and cooperative hunters were necessary to achieve this initial herd reduction goal. Since 1991, Quabbin hunters have been successful in both taking a large percentage of females (52.3% of harvest) and in reducing the deer herd in all management blocks. One of the greatest challenges in this type of hunt (rotations, short duration) is minimizing variables that influence harvest. In the last 10 years, DCR biologists have seen the female harvest fluctuate up and down, but show an overall decrease (Figure 3). As managers it is important to assess this and look for approaches that could dampen these

wild swings in female harvest. It is also important to distinguish between fluctuations that are an artifact of how the Quabbin hunt is administered or represent a true fluctuation of the female population.

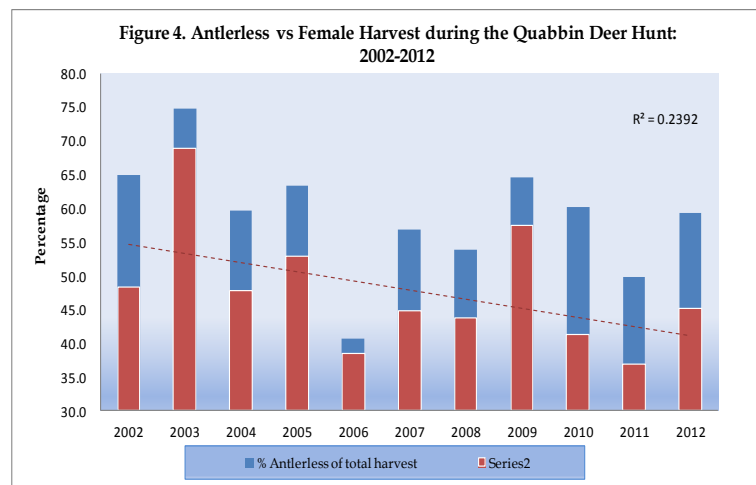


Female harvest increased in 2012. The overall female harvest was 36 does, making up 45% of total harvest. Since a large female harvest in 2009, the female harvest has significantly decreased. The percentage of females harvested (2012) in each hunting block ranged from 23.5- 60.9 percent (New Salem and Hardwick respectively).

Antlerless Deer (all females + male fawns) harvests have also seen large swings from 2001-2012. Since the large drop in 2006 (only 37.4%), the antlerless harvest has been steadily increasing until 2009. In recent years, (2009-2010) the average antlerless harvest reached over 60% (Figure 4). However, in 2011, the percentage of Antlerless Deer (49.8%) harvested decreased in all comparable hunting blocks. Up until 2010, the adult female harvest has been making up more of the antlerless harvest than fawns. In 2010 and 2011, a majority of the antlerless harvest was fawns (Figure 4). In 2012 about 50% of the Antlerless harvest was adult does.

The long-term success of the Quabbin hunt depends on the ability of hunters to control deer populations in a relatively short period of time. In order to accomplish our watershed protection goals, antlerless deer must be harvested at levels that prevent the deer herd from

damaging forest regeneration, while supporting a healthy herd and thus maintaining hunter interest. Future antlerless harvest rates will continue to be monitored closely and managed to achieve these goals.



C. HUNTER EFFORT, DEER DENSITY ESTIMATION AND YIELD

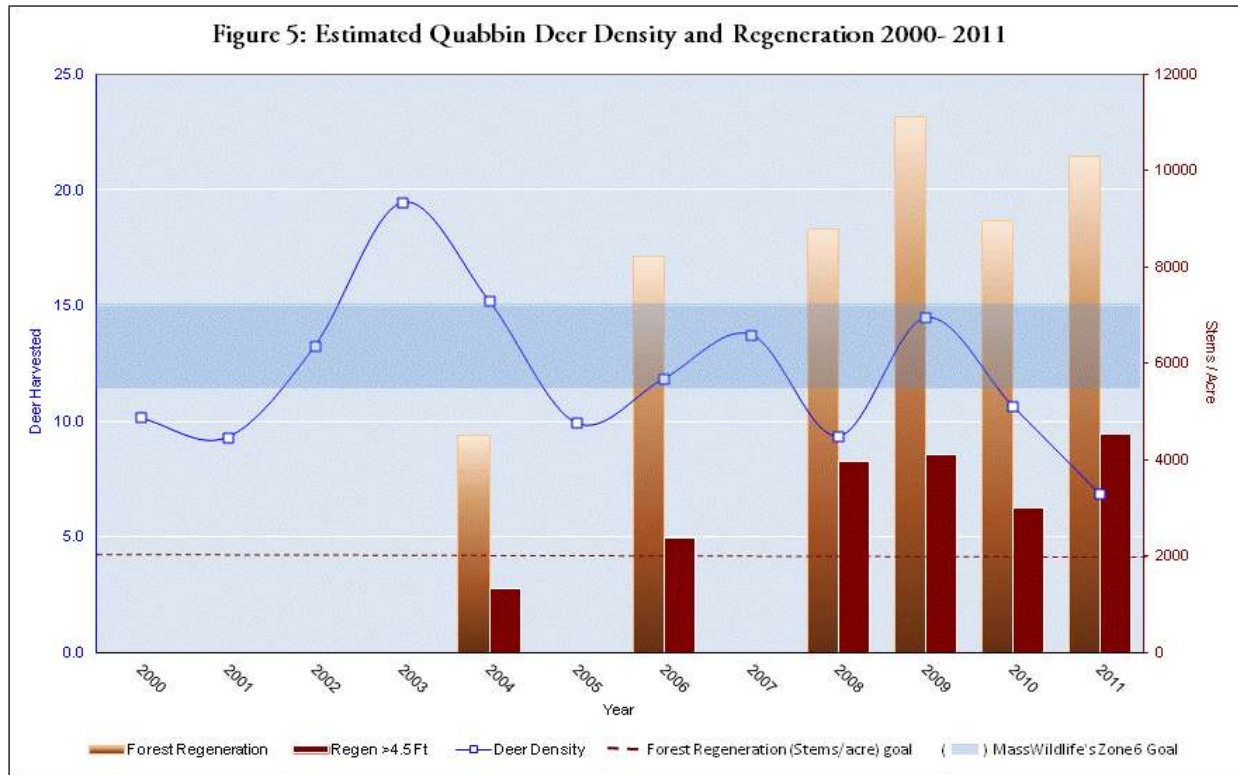
1. SUSTAINED YIELD THEORY

Sustained yield theory (SYT) is used often in practical wildlife management. In essence, SYT uses population dynamics to generate a productivity curve. If adequate and accurate data exists on reproduction, mortality, etc. then studying the curve and the parameters used to generate it, can result in estimates of carrying capacity, maximum sustained yield, and preferred population densities (for a detailed discussion on SYT, see **Quabbin Reservation: White-Tailed Deer Impact Management Program, Results of 1998 Program and Recommendations for 1999 Program**). At Quabbin, as in most cases, detailed information on reproduction, mortality, etc. does not exist. However, harvest statistics were used to assess the herd statistics relative to the sustained yield curve. Annual harvest, hunter effort, and an index of annual relative abundance (density) were plotted through time to examine trends in these parameters. Hunter Effort is measured by number of individual hunters that attend the hunt (either day) in each block and compared to Catch Per Unit Effort (CPUE) for trend data.

Yearly harvest was easily obtained and was represented as #deer killed/mi². To estimate relative abundance, several population estimates were made using the average of the Buck Kill Index, Sex-Age-Kill estimator and harvest:population ratio. Additionally, every 5 years the population is reconstructed using the harvest data. These estimators are used by several state wildlife agencies to look at trends in population data. While limited, because they use harvest data in their calculations, they still provide a useful way of analyzing the deer hunt at Quabbin. The Buck Kill Index assumes that the number of bucks killed each year is a percentage of the total population. Based on our population reconstruction, a ratio of 1/12 was used. Sex-Age-Kill estimator uses information collected by hunters to reconstruct (after the hunting season has ended) what the deer herd was when the hunting season began. The formula focuses on 1) buck harvest, 2) percent of bucks harvested, 3) doe to buck ratio and 4) summer fawn to doe ratio. The harvest:population ratio assumes hunters harvest a certain percentage of the population each year. A conservative ratio of .20 (or 20%) was used. The average from these estimates was used to generate density (deer/mi²) estimates for each year. Density estimates from 2000 to 2011 were plotted to examine the herd density once entering the maintenance phase of the program (Figure 5).

The goal of the Quabbin Deer Management Program is to maintain a deer density that allows for adequate and continued forest regeneration. Regeneration is monitored by the DCR-DWSP Foresters and described in their Regeneration Monitoring Reports. Forest regeneration data gives DCR Wildlife Biologists a harvest-independent measure of the effectiveness of deer management at Quabbin. Based on the 2012 Regeneration Monitoring Report, forest regeneration at Quabbin is meeting its Land Management goal of 2000 stems/acre above 4.5 ft - generally considered to be above deer browse height (Figure 5). However, tree species diversity is still dominated by white pine and black birch.

Although the Division of Water Supply Protection (DWSP) has different goals than the Division of Fisheries and Wildlife (DFW), since the Quabbin Deer Management Program reached maintenance levels in 2000, the overall deer density of the Quabbin Reservation deer herd has been at or slightly below DFW's Zone 6 deer density goal of 12-15 deer/mi² (personal communication) (Figure 5).



HUNTING BLOCK SUMMARY:

Each Hunting Block's (1) Hunter Effort, (2) Yield and (3) Deer Density Estimate are summarized below for the areas hunted in 2012. The Quabbin herd is managed as a whole, but due to the Reservoir separating the east and west sides of the Reservation, each hunting block is described to look at local trends.

Hunters harvested 18 deer in Pelham in 2012 (Table 2). Roughly 8% of the hunters successfully harvested a deer in this block. The percentage of female deer harvested was 50%.

Table 2. Results of Quabbin Reservation controlled deer hunt, Pelham Block, 2000-2012.

YEAR	# DEER	DEER/Mi2 ^a	Hunter Success	% FEMALE
2000	N/A ^b	-	-	-
2001	35	2.6	14.0%	48.6
2002	59	4.0	20.0%	45.8
2003	24	1.6	8.0%	50
2004	30	2.1	9.0%	50
2005	N/A ^b	-	-	-
2006	30	2.1	9.0%	36.7
2007	31	2.1	10.0%	38.7
2008	23	1.7	6.3%	39.1
2009	18	1.4	5.6%	55.6
2010	N/A ^b	-	-	-
2011	21	1.6	6.2%	23.8
2012	18	1.4	7.8%	50
Total (since 1991)	1216	4.6	14.0%	49.3

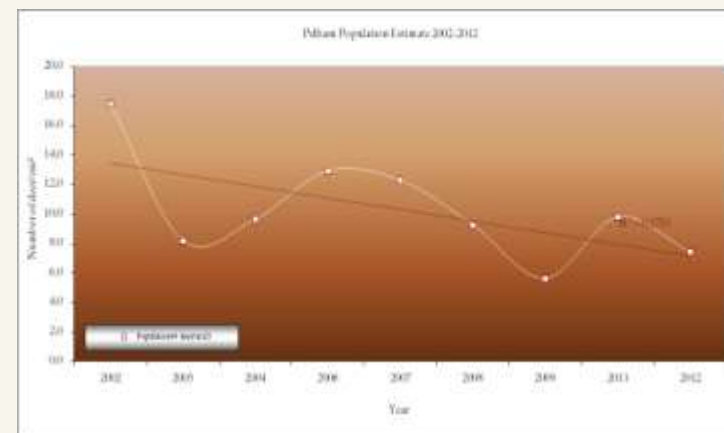
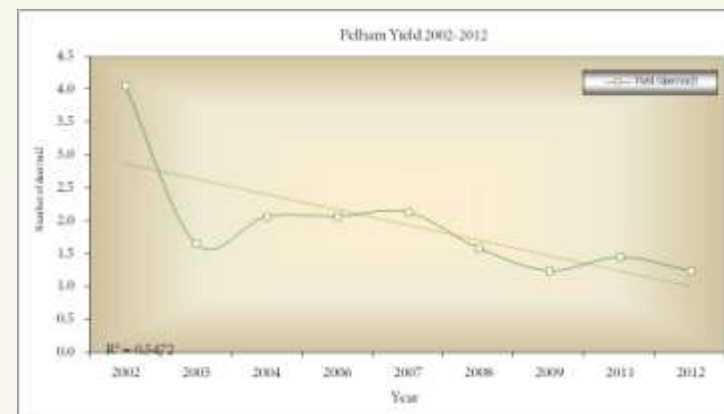
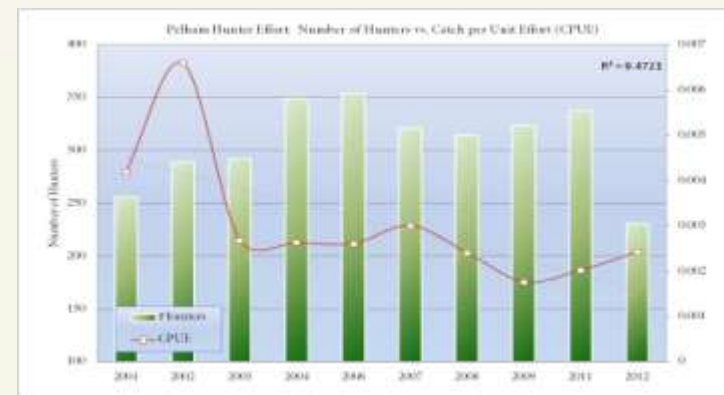
^a Represents the number of deer killed per square mile.

^b Area was not hunted during that year.

1. SUSTAINED YIELD AND POPULATION ESTIMATE

Trends in hunter effort have shifted slightly during the last several years. From 2003 until 2005, there was a gradual increase in the number of hunters in the Pelham block. The participation rate decreased (expected) from 338 hunters in 2011 to 231 hunters in 2012 as DCR decreased the hunter density to 1 hunter per 35-acres.

Trends in both yield and deer population continue to show an overall decrease even after increasing slightly in 2011. The population increase in 2011 probably reflects the ability of the deer population to rebound without a harvest pressure in 2010. After the large harvest in 2002, the deer herd in the Pelham block seemed to be stabilizing, with fewer large swings in yield, CPUE and population. Since 2000, the Pelham herd's density averages 11.0 deer/mi² and yields about 2.1 deer/mi².



Twenty-three (23) deer were harvested in Hardwick during 2012 (Table 3). Roughly 15% of the hunters successfully harvested a deer in this block. The percentage of female deer harvested was over 60%.

Table 3. Results of Quabbin Reservation controlled deer hunt, Hardwick Block, 2000-2012.

YEAR	# DEER	DEER/Mi2 ^a	Hunter Success	% FEMALE
2000	30	3.4	22.0%	50
2001	N/A ^b	-	-	-
2002	45	5.1	27.0%	48.9
2003	57	6.4	36.0%	64.9
2004	32	3.6	18.0%	46.9
2005	22	2.5	11.0%	63.6
2006	N/A ^b			
2007	26	2.9	13.0%	46.2
2008	18	2.0	8.8%	66.7
2009	51	5.7	27.7%	51
2010	24	2.69	13.9%	41.7
2011	N/A ^b			
2012	23	2.6	14.6%	60.9
Total (since 1993)	688	4.8	20.2%	55.5

^a Represents the number of deer killed per square mile.

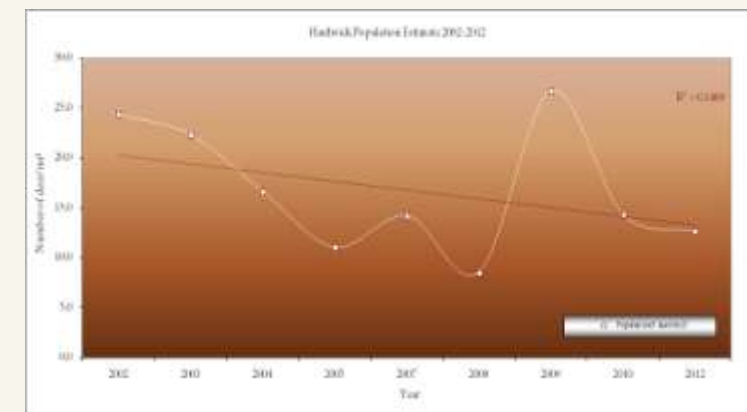
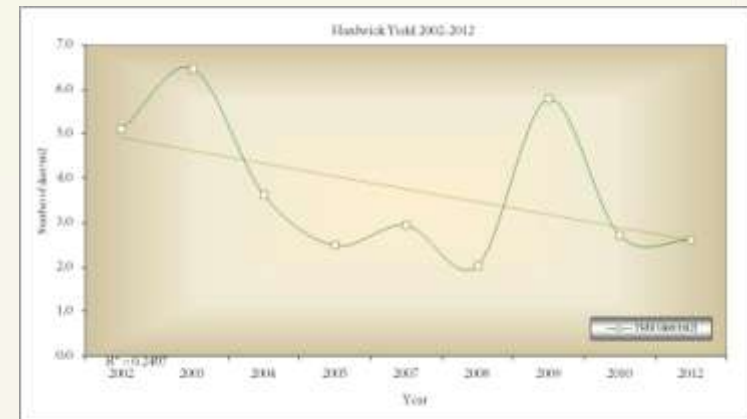
^b Area was not hunted during that year.

1. SUSTAINED YIELD AND POPULATION ESTIMATE

In 2012, the number of hunters in Hardwick was reduced as part of the overall reduction in hunter density to 1 hunter/ 35-acres. In 2012, there were 157 hunters with an average density of 1 hunter per 34.5-acres.

The lack of a significant hunt in 2008 was likely the leading factor for the population increase in 2009. This is a good example of what may happen to the deer population in the absence of regular hunting mortality. The Hardwick herd seems to have returned to maintenance levels.

Recently, the harvests in Hardwick have shown a large increase in population (i.e., 2003 and 2009). The population spikes have followed a rest year (2002) or followed a poor harvest (2007-08) due to weather. This was not the case in 2012 (rested in 2011). The 2012 Hardwick harvest was similar to the 3 year average of 24.5.



Twenty-six deer (26) were harvested in Prescott during 2012 (Table 4). Roughly 8% of the hunters in Prescott successfully harvested a deer. The percentage of female deer harvested was below 50%.

Table 4. Results of Quabbin Reservation controlled deer hunt, Prescott Block, 2000-2012.

YEAR	# DEER	DEER/Mi2 ^a	Hunter Success	% FEMALE
2000	35	1.8	11.0%	45.7
2001	21	1.1	7.0%	57.1
2002	26	1.3	8.0%	53.8
2003	N/A ^b	-	-	-
2004	60	3.1	15.0%	41.7
2005	48	2.5	13.0%	54.2
2006	33	1.7	9.0%	33.3
2007	62	3.2	17.0%	53.2
2008	N/A ^b	-	-	-
2009	46	2.4	11.9%	52.2
2010	45	2.4	11.6%	33.3
2011	19	1	5.0%	31.6
2012	26	1.4	7.6%	42.3
Total (since 1992)	1489	4.1	14.4%	49.5

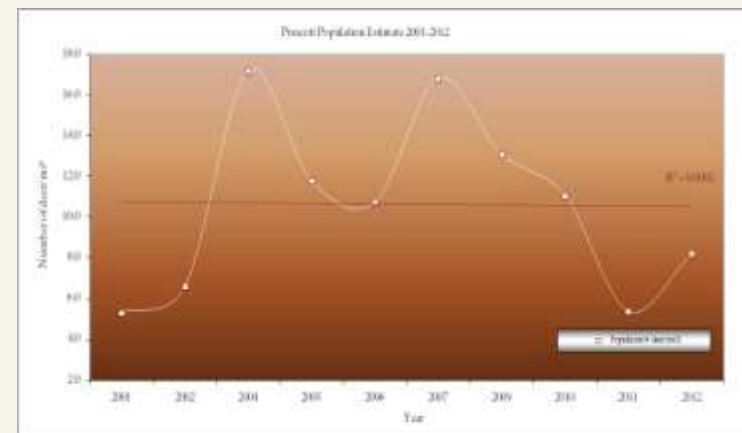
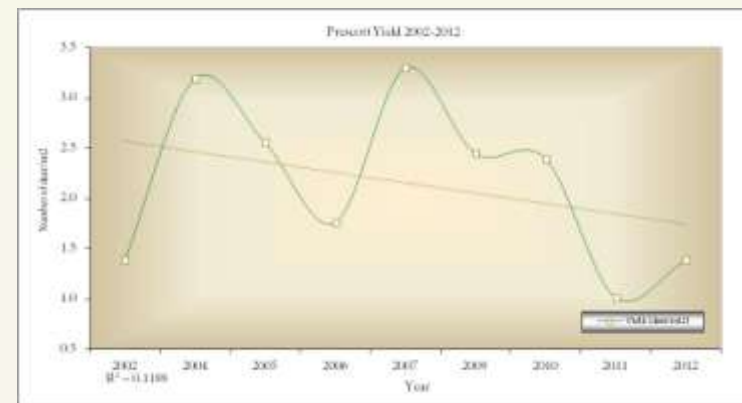
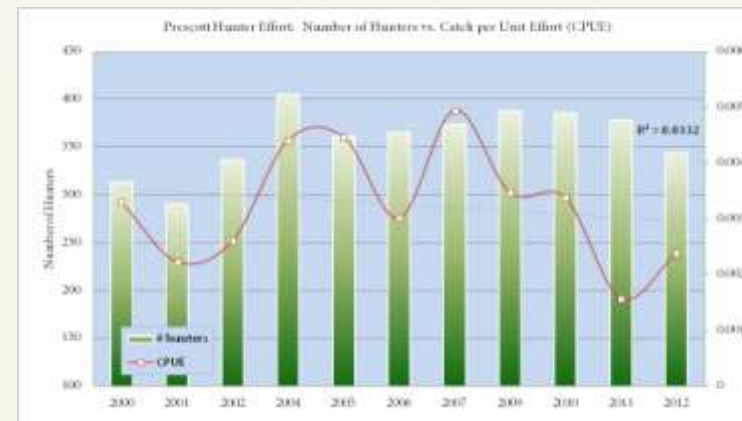
^a Represents the number of deer killed per square mile.

^b Area was not hunted during that year.

1. SUSTAINED YIELD AND POPULATION ESTIMATE

Hunter effort in the Prescott block has been consistent since 2005. Since the poor application years in 2000 and 2001 the number of hunters has been increasing and remains over 350 hunters. In 2012, the hunter effort slightly decreased from 379 hunters in 2011 to 344 hunters (top right) with an average density of 1 hunter per 34.9-acres. This was due to the reduction of hunters to achieve an overall hunter density of 1 hunter/ 35 acres.

Trends for yield and deer population had been steadily increasing since 2000. However in 2011, the harvest was lowest since we started in 1992. One year anomalies (large or small harvests) are not uncommon with short duration hunts. The population rebounded in 2012 and returned to the 3-year average. The Prescott herd's 5 year density averages 10.9 deer/mi² and yields about 2.1 deer/mi².



Seventeen deer (17) were harvested in 2 days during the 2012 New Salem hunt (Table 5). This was the highest harvest since 2007. Approximately 8.5% of the hunters in New Salem successfully killed a deer. The percentage of female deer harvested was significantly under 50%.

Table 5. Results of Quabbin Reservation controlled deer hunt, New Salem Block, 2000-2012.

YEAR	# Deer Harvested	DEER/Mi ² ^a	Hunter Success	% FEMALE
2000	23	3.1	16.0%	56.5
2001	17	2.3	15.0%	52.9
2002	23	3.1	13.0%	47.8
2003	13	1.8	8.0%	53.8
2004	N/A ^b	-	-	-
2005	12	1.6	7.0%	41.7
2006	15	2	11.0%	33.3
2007	28	3.8	15.0%	32.1
2008	15	2.1	8.5%	26.7
2009	N/A ^b	-	-	-
2010	15	2.0	9.8%	53.3
2011	9	1.2	5.8%	55.6
2012	17	1.6	8.5%	23.5
Total	378	3.0	11.2%	45.3

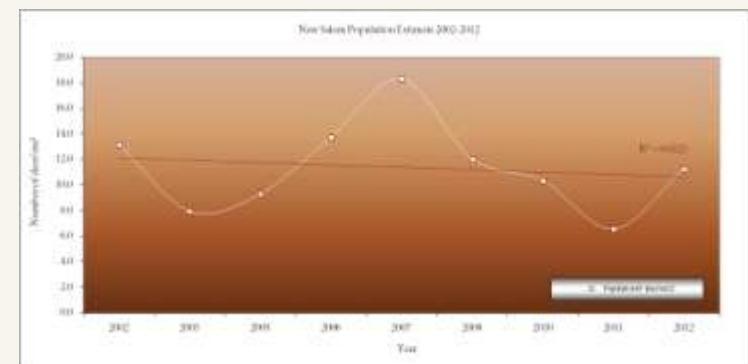
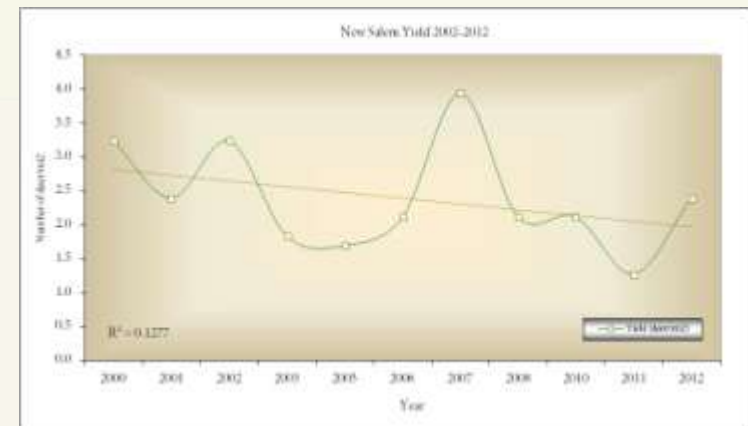
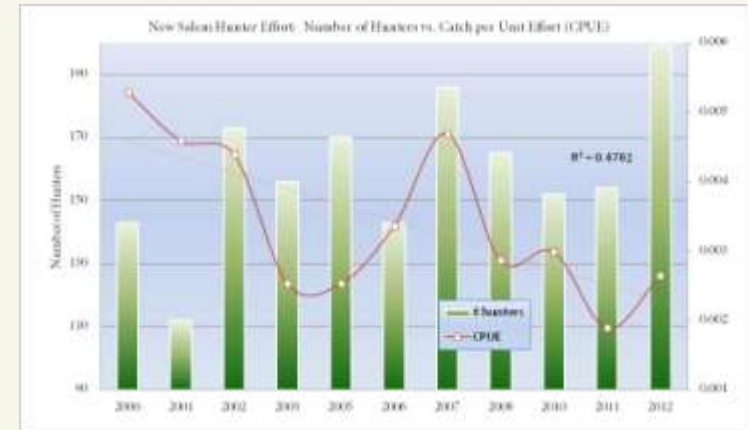
^a Represents the number of deer killed per square mile.

^b Area was not hunted during that year.

1. SUSTAINED YIELD AND POPULATION ESTIMATE

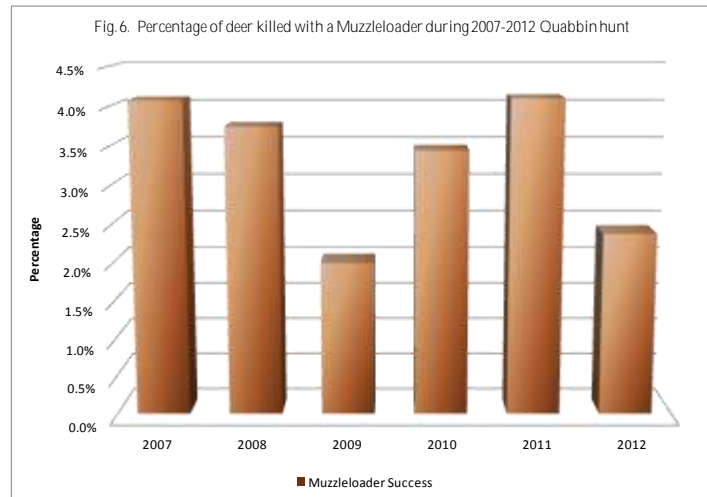
The number of hunters in New Salem increased significantly in 2012. In an effort to increase hunter dispersal, the northern portion of the Petersham block, a 2300-acre area from gate 37 north, was added to New Salem. This allowed about 45 more hunters into the New Salem zone. Three (3) deer were taken in these additional acres.

Recently, the trend for yield increased dramatically in 2007 but returned to normal levels in 2008 and 2010-12. Overall the population is stable and the yield fluctuation probably reflects the range of hunter effort. The New Salem herd's 5-year density averages about 11.7 deer/mi² and yields about 2.4 deer/mi².



D. PRIMITIVE FIREARMS- MUZZLELOADERS

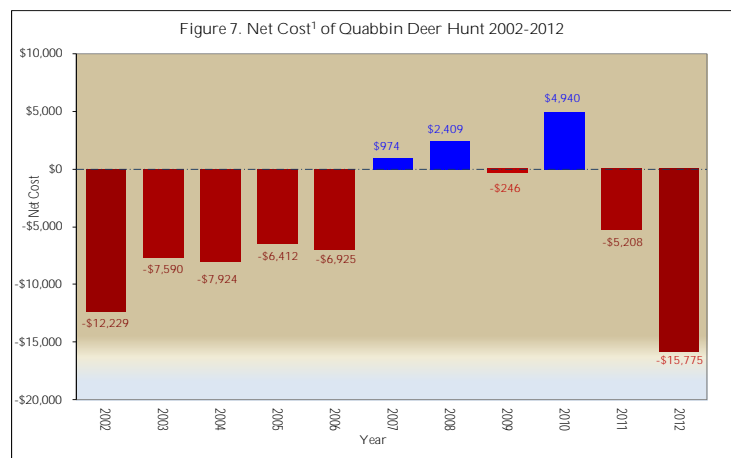
Based on hunter surveys conducted during 2006, the Division allowed Quabbin hunters the option to use either a shotgun or a muzzleloader for the first time during the 2007 deer hunt. Although hunters who hunt with primitive firearms outside Quabbin are not required to possess a FID card to hunt, for security, the DCR requires all hunters entering the Quabbin hunt to possess a valid FID card, regardless of what type of firearm they may use. While it is unknown how many hunters brought or used a muzzleloader in the Quabbin hunt, very few deer were harvested with a muzzleloader (Fig. 6).



E. PROGRAM COSTS

Application fees

Hunter surveys conducted prior to the 2006 Quabbin hunt indicated that most hunters were indifferent or supportive of a suggestion to raise the application fee to \$10 per hunter. Therefore, since 2007, application fees for the hunt were raised to \$10, and hunter applications did not decline (Figure 1). The net cost for the Quabbin controlled hunt was calculated by subtracting the total cost accrued (overtime for Division personnel, equipment rentals, printing, etc.)



¹includes overtimes costs for hunt personnel, equipment rentals and purchases, and miscellaneous other expenses.

from the revenue received from the application fee (Figure 7). From 1991-2006, the application fee was \$5.00 per hunter. Total cost for the hunt has decreased substantially since 1991. Revenue was dependent on the number of hunter applications, and it fluctuated yearly. In 2012, the application fee was again reduced to \$5 in preparation to transition the application process online in the next couple years.

III. STATUS AND RECOMMENDED ACTIONS FOR 2013

A. PROGRAM STATUS

With a hunt designed like Quabbin's Deer Management Program, there are many variables that could cause a swing (small or large) in harvest in any given year. When this is the case, prudent managers look at trends in density, effort and antlerless harvest. Overall, deer density continues to be relatively stable with no alarming positive or negative trends. Deer densities are at levels that allow for continued forest regeneration and growth, and these maintenance levels are on par with MassWildlife's healthy, huntable density goal of 12-15 deer/mi² for Zone 6 (in which Quabbin makes up most of the public huntable land). In 2012, we reduced the total number of hunters to achieve a hunter density of 1 hunter/ 35-acres. Even with fewer hunters out in the field, we increased our overall harvest by 15% from the previous year. Quabbin deer densities since 2000 (when we reached maintenance levels) average 12 deer/mi².

Although harvests can fluctuate from year to year, it is important to maintain an appropriate harvest of females (antlerless) in order to achieve our management objectives. This is particularly important since the Quabbin Reservation is only hunted for such a short duration each year. Within the 2 days of hunting, it is important to remove enough female deer to keep populations from growing to a level that interferes with the Division's forest regeneration goals. While any one year is not critical to the overall success of the program, it is important to monitor these trends carefully into the future. Although tree species diversity continues to be a challenge, forest regeneration (stems/acre) continues to improve across the watershed.



Rob Roy's 9-point, 211lb Buck harvested in Pelham in 2012. This is the largest buck ever harvested at Quabbin

B. RECOMMENDED ACTIONS

With a few exceptions, the Quabbin Deer Management Program in 2013 will be managed much like it has been since entering the Maintenance Phase.. Portable sanitary facilities will be placed throughout the hunt areas. The Division will continue with its check-in/check-out procedure. The check-in procedure uses perforated cards with unique numbers. This allows hunters to simply hand a number to the check station attendant and then leave, without having to wait for a card to be returned. In addition, the 4:00 p.m. checkout time will remain in effect. Biological data will continue to be collected on all harvested deer.

1. Hunting Block Rotation

DCR proposes to continue hunting at a maintenance level in all hunting blocks incorporating the 5-year rotation outlined below (Table 6). For the 2013 hunt, Prescott would be taken out of the rotation, and Petersham would be added back in. Each block would be hunted for one 2-day segment.

Table 6. Hunting block rotation on Quabbin Reservation, 2010-2014.

YEAR	AREAS HUNTED				
2010	Pelham	Hardwick	Petersham	Prescott	New Salem
2011	Pelham	Hardwick	Petersham	Prescott	New Salem
2012	Pelham	Hardwick	Petersham	Prescott	New Salem
2013	Pelham	Hardwick	Petersham	Prescott	New Salem
2014	Pelham	Hardwick	Petersham	Prescott	New Salem

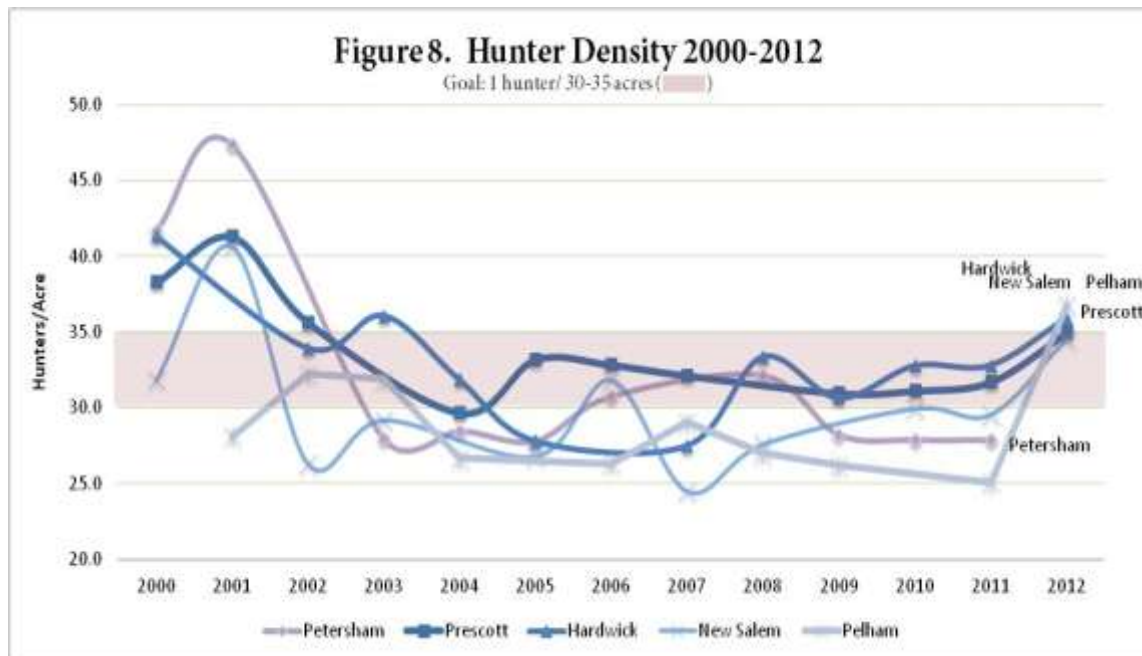
 Indicates the block not being hunted that year.

2. Maintain Adequate Hunter Densities

Maintaining optimum hunter densities is an important component of the Quabbin hunts, especially since hunts are short in duration. An original goal of 1 hunter per 30-35 acres was established in 1991. Since then, hunter densities have fluctuated, and in some years densities were substantially higher. The fluctuation in hunter density was a result of fewer hunter applications, so adjustments were made when assigning hunters to each block.

This goal has been established to allow for an adequate number of hunters to be distributed across the hunting block, ample hunting pressure to account for a short hunt, and a more direct interpretation of harvest results. Hunter densities below this goal should be avoided.

Recently, hunter density in some blocks has been drifting above the recommended goal for the Program (Figure 8). Hunter densities goals were adjusted in 2012 to achieve a hunter density of 1 hunter/ 35 acres. Additionally, each hunting block was recalculated using GIS to get a more accurate representation of the total area being hunted. A hunter density of 1 hunter / 35 acres will continue in 2013.



3. Control Hunter Distribution

Effectively distributing hunters throughout any of the hunting blocks has continued to be a challenge and in many ways is more important than actual hunter density. Some blocks (Prescott and Petersham) are extremely large, and it is easy to have hunters clump in certain areas, while other large tracts of land remain essentially unexplored.

In order to address this concern, DCR biologists will continue to collect data on hunter distribution using hand-held GPS units. In 2011 and 2012, the DCR conducted a pilot study to address the feasibility of collecting such information. The data that was collected was very informative and the hunters were more than willing to participate in the study. So in 2013, we will continue the Hunter Movement and Distribution study. The results will help biologists better understand how Quabbin is hunted by showing hunter distribution and movements through the hunting blocks.

In 2012, DCR changed the Petersham and New Salem zones (the area north of Gate 37 to Gate 33 was placed in the New Salem hunt block) in order to increase hunter dispersal. These reconfigured zones will continue to be used in 2013.

4. Application Process

In 2013, the Quabbin deer hunt application will again be made available on the Division website for downloading and printing. DCR will continue to charge the reduced application fee to \$5.00 in 2013.

Applications for the 2004-2007 Quabbin hunts included a section that asked hunters to indicate their willingness to hunt an additional segment. This featured allowed the Division to identify hunters who were willing and able to be placed in a second hunting segment in the event that there were too few applicants to fill a segment during the initial random drawing. While the Division did not need to use this option during the 2004-2007 hunts, this feature will remain on the 2013 application in case hunter interest declines. Hunters will be allowed to apply in groups of up to 6 people. Each hunter's Customer ID number on the application will be included in the random drawing.

In 2006, hunters were surveyed about the Quabbin hunt experience. Hunters will be surveyed again in 2013. The Survey asks about their satisfaction with the implementation and quality of the Quabbin hunt.

5. Continue to allow hunters to hunt with muzzleloading black powder rifles

Results from the 2006 hunter survey indicated that hunters were overwhelming in favor of allow muzzleloading rifles in the Quabbin hunts. While very few deer are harvested (avg. 4 deer/yr) with a muzzleloader,, there is some continued interest from hunters. Statewide, there has been a noticeable increase in the popularity of primitive firearms (archery and black powder). Hunters will be allowed to hunt with either the traditional shotgun (slugs only) or with a muzzleloader. Hunters will still be required to possess a valid FID card.

C. OTHER HUNT CHANGES

1. Antlerless Permits

Since 2000, DCR's Deer Management Program has been in a maintenance phase. Our herd density is similar to density goals MassWildlife has established for Zone 6 (12-15 deer/mi²). As a result, DCR biologists met with MassWildlife to discuss the management of Zone 6 and how to better coordinate management efforts between agencies. Quabbin makes up most of the huntable area in Zone 6 but has been managed differently over time as goals have changed from the initial deer reduction phase to current deer herd maintenance. MassWildlife and the Division recognize that both agencies have similar management goals and also understand that deer move within Zone 6 on and off the Reservation. Therefore, both agencies will work to manage deer

within Zone 6 as one population. This change in management approach allows us to compare Quabbin with the surrounding forests of Zone 6 managed by MassWildlife.

Deer density is controlled by the management of the number of females in the herd. Antlerless harvest is one of the most important components of a deer management plan. The number of breeding females influences density more than any other demographic. In the beginning, we required every Quabbin hunter to purchase an antlerless permit with the opportunity to purchase a second. The idea was to reduce the number of females available to breed. We achieved this dramatic deer reduction after several years of hunting. Because our management goals have changed, the Division has reevaluated how antlerless permits are issued. Starting in 2012, we eliminated the second antlerless permit. Additionally, it is no longer *required* that Quabbin hunters purchase an antlerless permit. In 2013, every hunter accepted will have the option to purchase one antlerless permit from MassWildlife. These permits will be sold directly through MassWildlife's online permit sales. These antlerless permits will still be considered "bonus permits" and not count towards their statewide bag limit.

The bag limit at Quabbin will continue to be 2 deer. Hunters will be restricted to only 1 antlerless deer harvest (Quabbin Permit only), but as in the past they may fill their buck tag(s) during the Quabbin hunt. Zone 6 antlerless permits will NOT be permitted to be used inside Quabbin's gates.

2. Scouting

The Division will again allow 2-day vehicle scouting for all hunting blocks this fall. The Division allows all hunters the opportunity to drive into their hunting block for 2 days of scouting. These 2-day vehicle scouting opportunities are designed to improve hunter distribution and hunter success. Scouting hours will again be from 8 am to 3 pm. This accommodates hunter desire to scout multiple locations within their hunting block. Hunters must check-in to area by 1 pm on the day of scouting. Additionally, in response to hunters' request to have more time separating the scouting weekend from the hunt, the scouting weekend is now held the weekend before Thanksgiving.

3. Hunter Orientations

The frequency of Hunter Orientations was changed in 2012. Previously, hunters had to attend an orientation every 6 years. In 2012, the Division recommended increasing that to every 7 years (i.e. any hunter that hasn't had an orientation since 2006). 2013 Orientations will still be required for any new hunters and any hunter that hasn't been in the past 7 years.

D. QUABBIN PARK

The Division continues to have internal discussions regarding the management of Quabbin Park. Population studies conducted in 2003 and 2007 indicate an extremely high deer density

within the park. In addition, recent regeneration surveys within the park indicate a relatively low number of woody stems. The large number of deer within the Park has a potentially large impact on a variety of things. Internal discussions have touched on a diversity of topics including:

- a. The large deer herd and the associated abundance of deer ticks and rate of Lyme disease
- b. The effects of the deer herd on regeneration on Park lands both on and off watershed
- c. The potential of the deer herd within the Park to serve as a source population for other areas of the Reservation and serve as a refuge during times when other areas of the Reservation are hunted.
- d. A variety of public opinions regarding the deer herd within the Park and how they should be managed (if at all).

An official Quabbin Park Plan will be drafted in 2013-2014, and will include how deer management will move forward in the Park.

E. PARAPLEGIC HUNTING

Quabbin Reservation has hosted a paraplegic hunt for the Division of Fisheries and Wildlife (DFW) since 2000. This hunt is held in October-November each year outside the regular firearms deer hunting season. Typically 4-6 hunters participate in the hunt at Quabbin, and approximately 18 deer have been harvested over the last 11 years. In 2012, two deer were taken at the Quabbin hunt (both does). Hunting has taken place in a variety of locations around the administration building within Quabbin Park. Quabbin Reservation will continue to host the paraplegic hunt each year in cooperation with DFW. The 2013 hunt will be held on October 31- November 2.